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Locality and position.—The only specimen of this fossil we have seen is in a granular mass of decomposing chert, containing some fragments of small crinoid columns. It was obtained from the Subcarboniferous rocks of Missouri, but the exact locality and position we have been unable to ascertain.

Note on the genus GILBERTSOCRINUS, Phillips.

BY F. B. MEEK.

Genus GILBERTSOCRINUS, Phillips, 1836.

Gilbertsocrinus, Phillips, Geol. Yorkshire, part ii., p. 207, 1836.

Goniasteroidocrinus, Lyon and Casseday, Am. Jour. Sci. xxviii. p. 233, 1859.

Trematocrinus, Hall, Sup. Iowa Report, p. 70, 1860.

Phillips' diagnosis of this genus reads as follows:

"Basal joints five, forming a pentagon; suprabasal [subradials] five, hexagonal, forming a decagon with five re-entering angles, from which proceed five heptagonal first costals [first radials] and five hexagonal second costals, [second radials], bearing a pentagonal scapula [third radial] supporting joints [secondary radials] which combine into rounded arms perforated in the centre. First intercostals [first interradians] pentagonal. The following species have been usually referred to *Rhodocrinus*, Miller, from which, it appears to me, they differ entirely." (Phillips.)

He mentions but the following three species, viz., *G. calcaratus*, *G. mammillaris* and *G. bursa*, all from the subcarboniferous. His specific descriptions are very brief and unsatisfactory, but his figures are tolerably good, and give a sufficiently intelligible idea of the generic characters of the group. From these figures, and his description, it is therefore evident that the formula, in accordance with the later improved nomenclature, may be stated as follows:

Generic formula of *Gilbertsocrinus*.

Basal pieces 5.

Subradials 5.

Radials 3×5 .

Secondary or supradials 3 or 4×10 .

Anal and interradian pieces 12 to 15×5 .

Pseudo-brachial appendages (arms of some authors) 5, located over the rays.

Arm-openings (ambulacral,) 10, located directly under the pseudo-brachial appendages.

On comparing this formula with the following, given by Messrs. Lyon and Casseday, of *Goniasteroidocrinus*, cited above, the close relations of these crinoids will be apparent.

Generic formula of *Goniasteroidocrinus*.

Basal pieces 1×5 , pentagonal, perforation not visible.

Subradial pieces 5, hexagonal, nearly equal in size.

Primary radial pieces 3×5 , first spiniferous.

Secondary radials 3×10 , hexagonal.

Interradian fields [including the anal area] 5×13 to 14 , [pieces each].

Interbrachial fields 5×1 to 9 , [pieces each].

It may be proper to explain that the term pseudo-brachial appendages is used in the formula of *Gilbertsocrinus*, for the parts regarded by Phillips and by Messrs. Lyon and Casseday as arms, and that arm-openings, not alluded to by Phillips in his description, though clearly shown in his figures, are mentioned. These openings were not observed by Lyon and Casseday, because they were hidden in their specimens by the attachment of the small pendulous true arms, or, in the absence of the latter, by portions of the matrix, as is known to the writer from the examination of specimens of their typical species loaned by Mr. Lyon.

[Aug.

It will therefore be seen that, excepting in mere specific details, these formulas, as far as they go, agree exactly. There is, however, a character which, although not apparent in Messrs. Lyon and Casseday's formula, was nevertheless mentioned in their description, in which the types of these groups differ, that is, in the position of the pseudo-brachial appendages (arms of Phillips and of L. and C.) with relation to the other parts. In *Gilbertsocrinus* these appendages are placed directly over the arm-openings and above the inter-brachial spaces, while in *Goniasteroidocrinus* they stand over the interradial spaces.

There may be various opinions in regard to the value of such a difference, but to the writer it seems of not more than subgeneric importance. If these appendages were true arms, or like the arms in other crinoids, designed to support the reproductive organs, ("conceptacula,") little doubt could be entertained in regard to the full generic value of such a difference in their position. The fact, however, that although provided with a central cavity through their entire length, they have nowhere any external openings, being as it were hermetically sealed, is conclusive evidence that they could have performed no such function. Hence it is probable they should be viewed rather as being in some respects analogous to the lateral branches, or verticils, so often given off from the columns of *Platycrinus* and other crinoids. This opinion seems to derive support from the fact that, in some of the typical forms of *Gilbertsocrinus*, as well as in American species of *Goniasteroidocrinus*, these appendages, at their origin, consist of a double series of pieces, pierced each through the centre by the only cavity they possess, exactly like the joints of a column, or those of its lateral branches, for which latter they might readily be mistaken, if found detached.

From all the facts it seems probable, therefore, that the only relations these false arms bore to the reproductive system, was that of strong rigid guards thrown off from the margins of the dome, for the protection of the slender, true ova-bearing arms hanging beneath them. Hence, although their existence or absence may be a good generic distinction, their position over the interradial, or interbrachial spaces, can scarcely be regarded as such.

It will probably be remembered that, in a paper read before the Academy by Prof. Worthen and the writer, in September, 1860, and published in the Proceedings for that month, (p. 383), we suggested that a genus proposed by Prof. Hall at about the same time, under the name *Trematocrinus*, was apparently very closely related to *Goniasteroidocrinus*, Lyon and Casseday, 1859, and that we should not be surprised if it would prove to be the same. Having recently had an opportunity, through the politeness of Mr. Lyon, to examine good specimens of the typical species of the latter, the writer is completely satisfied that there is not the slightest generic or even subgeneric difference between the types for which these two names were proposed,* and as Lyon and Casseday's name has priority, it will have to be retained for the group, whether we regard it as a genus or a subgenus. It is true the later name is shorter and more euphonious, but we have no right for that reason to make it an exception to the generally accepted law of priority. It is surely not greatly more objectionable than *Macrostylocrinus*, Hall, still retained by its author instead of the later name *Cytocrinus*, Roemer.

The following are the American species of this group, viz.: *Gilbertsocrinus* (*Goniasteroidocrinus*) *tuberosus*, Lyon and Casseday; *Gilbertsocrinus* (*Goniast.*) *fiscellus*, = *Trematocrinus* *fiscellus*, Meek and Worthen; *Gilbertsocrinus* (*Goniast.*) *typus*, G. (*Goniast.*) *tuberculatus*, G. (*Goniast.*) *papillatus*, G. (*Goniast.*) *robustus*, and G. (*Goniast.*) *spinigerus*, = *Trematocrinus* *typus*, *T. tuberculatus*, *T. papillatus*, *T. robustus* and *T. spinigerus*, Hall.

* As already stated, it was ascertained from the examination of Mr. Lyon's typical species, that it possesses the same ambulacral openings as the species upon which *Trematocrinus* was founded; and that the slender pendulous "plumose cilia" of Lyon and Casseday (here regarded as true arms) are connected with these openings, as the arms of other palaeozoic crinoids connect with the arm openings, excepting that they hang down, instead of ascending.